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ABSTRACT

This report is essentially a "map" of the available reports prepared to evaluate the Comprehensive School Mathematics Program (CSMP) over a nine-year period. These evaluations were conducted during the development and pilot testing of CSMP by an evaluation staff independent of the program developers and guided by an external evaluation panel, in cooperation with approximately 40 school districts. An initial chart serves to classify the reports; then a brief (usually one-page) summary is given for each evaluation report and cooperative research study. (MNS)

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# SUMMARIES OF EVALUATION REPORTS OF THE COMPREHENSIVE SCHOOL MATHEMATICS PROGRAM

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# Summaries of Evaluation Reports of the Comprehensive School Mathematics Program

July 1983

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## Introduction

The Comprehensive School Mathematics Program is a K-6 mathematics curriculum developed by CEMREL, Inc., one of the regional educational laboratories funded by the National Institute for Education through 1982. Final production of materials and summary evaluation reports were completed by McREL, another of the NIE educational regional laboratories.

During the development and pilot testing of this curriculum, an extensive evaluation was conducted by an evaluation staff independent of the program developers and guided by an external Evaluation Panel. The work took place over a period of nine years in cooperation with approximately 40 school districts at one time or another.

This report is essentially a "map" of the available evaluation reports, together with a very brief summary of each. The best single summary report, integrating all previous reports, will be completed and available from NIE in December, 1983.

## Classification of Reports

The two tables on the next pages classify reports from a) the Evaluation Reports which describe general evaluation studies conducted by CEMREL's Mathematics Research and Evaluation Studies group (MRES) and b) Cooperative Research Studies, reports of evaluation studies conducted jointly by cooperating school districts and MRES.

The reports themselves are listed along the left margin of the tables. The various subject matters of these reports are listed across the top. Then in the table are numbers (or in some cases a range of numbers). Each number (or range) indicates (a) the existence of a report given directly to its left in the margin, (b) the subject matter of that report (given directly above it at the top) (c) the grade level(s) of the student and/or teachers involved.

Some of the numbers are circled. This signifies that the indicated report covers the school year when the major evaluation effort was being made at that grade level. Thus an uncircled number signifies that the report covers a time when the major evaluation effort was focused on another grade level.

Hence if one wished (for instance) to read the report on the major findings relative to standardized tests at the third grade level, one would first locate that subject at the top and then read directly below it until reaching a circled 3. To the left of that (3) would be the report of interest (in this instance 4-B-1).

## Description of Evaluation Report Series

| Report Number | Summary | Intrinsic Merit | Practicality: Teacher Quest. | Practicality: Teacher Interview | Practicality: Other | Student Outcomes: Student Tests | Student Outcomes: MANS Tests | Student Outcomes: CSMP Tests | Student Outcomes: Student Interviews | Student Outcomes: Other | Page Number |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 A 1 | K - 6 | | | | | | | | | | 7 |
| 1 A 2 | | K - 2 | | | | | | | | | 8 |
| 1 A 3 | K - 1 | | | | | | | | | | 9 |
| 1 B 1 | | | | | | | | 1 | | | 10 |
| 1 B 2 | | | | | | | | 1 | | | 11 |
| 1 B 3 | | | | | | 1 | | | | | 12 |
| 1 B 4 | | | | | | (K) | | | | | 13 |
| 1 B 5 | | | | | | | 1 | | | | 14 |
| 1 B 6 | | | | | | 1 | 1 | 1 | | | 15 |
| 1 C 1 | | | | | (K) 1:T.Training | | | | | | 16 |
| 1 C 2 | | | | | 1: Observations | | | | | | 17 |
| 1 C 3 | | | (K) 1 | | | | | | | | 18 |
| 1 C 4 | | | (K) 1 | | | | | | | | 19 |
| I C 5 | | | | (K) | | | | | | | |
| 1 C 6 | | | | | (K) 1 T. Logs | | | | | | 21 |
| 2 A 1 | (1) 2 | | | | | | | | | | 22 |
| 2 B 1 | | | | | | 2 | 2 | 2 | | | 23 |
| 2 B 2 | | | | | | (1) | | (1) | | | 24 |
| 2 B 3 | | | | | | | | | 2 | | 25 |
| 2 C 1 | | | K (1) 2 | | | | | | | | 26 |
| 2 C 2 | | | | 2 | | | | | | | 27 |
| 2 C 3 | | | | (1) | | | | | | | 28 |
| 3 B 1 | | | | | | (2) 3 | (2) | (2) 3 | | | 29 |
| 3 C 1 | | | (2) 3 | | | | | | | | 30 |
| 4 A 1 | (3) | | | | | | | | | | 31 |
| 4 B 1 | | | | | | (3) | | | | | 32 |
| 4 B 2 | | | | | | | (3) | | | | 33 |
| 4 B 3 | | | | | | | | | (3) | | 34 |
| 4 C 1 | | | (3) | | | | | | | | 35 |
| 5 B 1 | | | | | | 4 | 4 | | | | 36 |
| 5 B 2 | | | | | | | | | 4 | | 37 |
| 5 C 1 | | | 4 | 4 | | | | | | | 38 |
| 6 B 1 | | | | | | (4) | (4) | | | | 39 |
| 6 B 2 | | | | | | 5 | 5 | | | | 40 |
| 6 C 1 | | | 3 (4) 5 | | | | | | | | 41 |
| 7 B 1 | (5) | | | | | | | | | | 42 |
| 7 B 2 | | | | | | (5) | (5) | | | | 43 |
| 7 B 3 | | | (5) | | | | | | 5 | | 44 |
| 7 B 4 | | | | | | | | | | 2 Re Eval. MANS | 45 |
| 7 B 5 | | | | | | | | | | 4 CSMP Grads | 46 |
| 7 B 6 | | | | | | | | | | 2-4 Rapid Implemen. | 47 |
| 8 B 1 | | | | | | 6 | 6 | | | | 48 |
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Description of Cooperative Research Studies

| | Grade Level | Type of Community | Gifted (G) or Regular (R) | Number of Classes Tested | Page Number |
|---|---|---|---|---|---|
| Bedford, 81 | 2 | Exurban | R | 4 | 57 |
| Detroit, 81 | 2 | Urban | Title I | 20 | 58 |
| Grinnell, 81 | 2-4 | Small City | G | 3 | 59 |
| Harrisonville, 81 | 2-6 | Small City | G | 3 | 60 |
| Janesville, 81 | 2-4 | Small City | G | 21 | 61 |
| Janesville, 81 | Implementation Study | | | | 62 |
| Ladue, 81 | 6 | Suburban | R | 12 | 63 |
| New Orleans, 81 | 2,3,6 | Urban | Title I | 25 | 64 |
| Ann Arbor, 82 | 2,3 | Small City | R | 93 | 65 |
| Bronx, 82 | 4 | Urban | R | 3 | 66 |
| Detroit, 82 | 3 | Urban | Title I | 19 | 67 |
| Glendale, 82 | 2-5 | Small City | R | 19 | 68 |
| Globe, 82 | 2 | Small City | R | 4 | 69 |
| Hawaii, 82 | 2 | Suburban | R | 6 | 70 |
| Janesville, 82 | 2-5 | Small City | G | 15 | 71 |

Evaluation Report 1-A-1

Overview, Design and Implementation

1974

The purpose of this report is three-fold. First, a description is given of CSMP, both as a development project and as a product, ie. as a mathematics curriculum. Second, the goals of the evaluation and the kinds of questions it is intended to answer are described. Third, the design of the pilot trial and the particular data and instruments used to collect that data during the first year of the pilot trial are given.

Thus this report is intended to be a background report describing the general nature of the program and the way in which the evaluation is being carried out rather than a presentation of any actual results. Report 1-A-3 gives a summary of the results from the first year; the other reports provide data attending to particular issues. Hopefully the present report will serve as an "organizer" for the many evaluation reports of this series.

Evaluation Report 1-A-2

External Review of CSMP Materials

1974

In order to have the soundness and relevance of the program appraised, the program agreed to the selection of an independent set of math education experts for the purpose of reviewing the materials. In the field of mathematics education, and one suspects within any academic discipline, there is a wide divergence of opinion as to what pedagogy should be used to teach what content to school children. Therefore the program is to be commended for wholeheartedly cooperating in an enterprise which it could avoid and which could produce rather embarassing results.

Five persons were selected:

Professor Shirley Hill
University of Missouri at Kansas City

Professor Dan E. Christie
Bowdoin College

Professor Leonard Gillman
University of Texas at Austin

Professor George Springer
Indiana University

Professor Sherman Stein
University of California at Davis

Dr. Shirley Hill agreed to serve as chairman of the group an to summarize the set of reviews.

This report gives each expert's review verbatim in addition to Dr. Hill's summary.

Evaluation Report 1-A-3

Final Summary Report Year 1

1974

The present report is an attempt to summarize, in a reasonably non-technical way, the information collected during this first year of CSMP's Extended Pilot Test. While it is not possible, nor necessarily desirable, to suppress the opinions and prejudices of the evaluator, one hopes the reader can easily separate the presentation of data from the author's interpretation of those data. In any case, if the reader wishes more information about certain of the data reported here or would like to see the actual tests or questionnaires or instruments used, he or she may consult the appropriate report in this Evaluation Report Series.

Evaluation Report 1-B-1

Mid-Year Test Data: CSMP First Grade Content

1974

The purpose of this report is to describe the results of a test administered to local first grade classes approximately half-way through the school year. The test covered, with one exception, those specific topics of the CSMP curriculum for which students should have been at or near what might be called a "mastery" level:

relations, multiplication, number-numeral,
addition, minicomputer, order

In the authors' opinion the levels of attainment were reasonable. Since there was no comparison group, no more definitive statement could be made.

A comparison group was impractical due to the impossibility of eliminating specific CSMP content from the tests.

Evaluation Report 1-B-2

End-of-Year Test Data: CSMP First Grade Content

1974

The purpose of this report is to describe the results of the end-of-year test of CSMP content administered to 14 local first grade classes in May of 1974. The test (with its 12 subtests) generally covered those specific topics of the CSMP curriculum for which there were clearly defined tasks that students should have been able to do.

Judgments of the adequacy of the CSMP students' performance (very good, adequate, inadequate, very poor) on the end-of-year test are not made in comparison to the math performances of classes from past years, or in comparison to Non-CSMP classes in the study. Judgments have been made relative to CSMP students' performance on types of problems which frequently appear in the first grade program, particularly in the workbooks. In most cases the same language and formatting have been used in the test as in the workbooks.

While there is some variation across subtests in the judgments regarding adequacy of student performance, the top two quarters of students were almost always rated as very good. The third quarter was most often rated as adequate and the bottom quarter as inadequate.

The large discrepancy in performance between the highest and lowest scoring students was examined in light of performance on the Test of Standard Content* (See Report 1-B-3) where there were also large differences between high and low scoring students. It was found that those differences occurred consistently and to the same degree in CSMP and Non-CSMP classes.

Evaluation Report 1-B-3

End-of-Year Test Data: Standard First Grade Content

1974

This report deals with the question; "Can CSMP students, after completing first grade, demonstrate the arithmetic skills and knowledge of the concepts traditionally expected from first grade students?"

Sixteen teachers in five school districts of the metropolitan St. Louis area, after attending a one-week training session, taught the CSMP curriculum to their first grade students. For each CSMP class, a comparison class was designated.

Based on an analysis of leading texts, a series of seven tests was constructed. An eighth test dealt with larger numbers.

A comparison of the CSMP versus Non-CSMP classes revealed the following:

a) CSMP classes scored significantly higher on Test 8: Larger Numbers,

b) CSMP classes scored higher on Place Value and Measurement,

c) Non-CSMP classes scored higher on Subtraction,

d) There were no differences on the other tests:
Numeration, Addition, Order, and Application.

Evaluation Report 1-B-4

End-of-Year Test Data: CSMP Kindergarten Content

1974

While the primary evaluative emphasis in 1973-74 was on first grade classes, some data was gathered from local kindergarten classes as well.

A test measuring the objectives of the CSMP kindergarten curriculum was constructed and administered to some local CSMP kindergarten classes and to some comparison kindergarten classes in May, 1974. This report describes that test; its construction and the results.

The test consisted of 12 subtests, nine of which covered topics normally covered in Kindergarten while three covered topics unique to CSMP.

In summary, the CSMP students appear to have "mastered" the objectives represented by the twelve subtests with the exception of objectives 9 and 10 dealing with arrow diagrams and scored as high as or higher than Non-CSMP students on all subtests.

Evaluation Report 1-B-5

Test Data on Some General Cognitive Skills

1974

Three types of student outcomes were studies during 1973-74 at the first grade level:

a) Student achievement of the content of the CSMP program,

b) Student achievement of the standard skills and concepts generally expected in mathematics and

c) Long range effects on students' ability to "think mathematically."

Of course "thinking mathematically" conveys very little to the reader until some more detailed explanation of the task is given. What is intended by c) is the issue of whether or not CSMP students can do better than Non-CSMP students at certain tasks which are not dependent on the unique content of the CSMP program for their solution. They are in a sense content-free and can thus be considered one form of transfer task.

Three such content-free tests were constructed and administered on an individual basis to first grade students from CSMP and comparison classes, from four to six pairs of classes for each test.

CSMP classes had higher mean scores than comparison classes on all three tests, but this difference did not reach the .05 level of significance on any of them. Thus the evidence is at best "suggestive," and rather strongly so for Tests 2 and 3, of superior performance by CSMP students.

Evaluation Report 1-B-6

Summary Test Data: Detroit Schools

1974

This report not only provides information regarding the success of the program in Detroit, but also allows the comparison of results obtained locally with those from a rather different pilot site.

One might summarize the test data by saying that CSMP classes did very well compared to Non-CSMP classes on tests of standard content and general cognitive skills. They also did reasonably well on the CSMP tests if one takes into account the rather meager progress of five of these classes. Of the twenty-six other first grade teachers, some with low ability classes, who responded to the end-of-year questionnaire, only four covered fewer than 200 lessons, yet five of the seven Detroit classes did not complete as many as the first 150 lessons.

Evaluation Report 1-C-3

Mid-Year Data from Teacher Questionnaires

1974

In January a questionnaire was sent to all kindergarten and first grade teachers in the CSMP Extended Pilot Trial. Seventy-nine percent of the questionnaires were completed and returned to CEMREL.

In summary,teachers had few difficulties in presenting the topics, students liked the topics a great deal, and while responses were generally favorable regarding difficulty for students, some content areas were perceived as being rather difficult.

Asked to rate various components of the program, most items drew very favorable responses.

Asked about the overall worth of the program, most teachers thought that CSMP students were far more involved and that the overall quality of the program was higher than was their previous mathematics program.

There were, however, three areas of moderate dissatisfaction:

1) The adequacy of the program and the rapidity of the pace for low ability students.

2) The management of instructional materials and

3) Student difficulties in one or two areas of content.

The responses to these issues can perhaps best be categorized as neutral to slightly negative. On the other hand for the vast majority of items responses were very favorable.

Evaluation Report 1-C-1

Teacher Training Report

1974

This report describes the 5 workshops conducted during the summer of 1973 to prepare teachers and coordinators for the implementation of the program: the instructional materials, the workshops format and the math content covered.

In addition it presents the data collected from the 69 workshop participants with a background questionnaire, a reaction questionnaire and a post test of content covered.

Evaluation Report 1-C-2

Observations of CSMP First Grade Classes

1974

The purpose of this report is to describe the observations carried out in 14 of the local first grade classes. In the first section, the purpose and design of the observations are spelled out. Subsequent sections present the results of the observations including descriptions of the classes, the observation form used, and implications for the program.

On the basis of the observations the following conclusions were drawn.

1. In general, most of the teachers we observed implemented the program in an acceptable manner.

2. The program appeared to vary as the makeup of the classes and teacher styles varied.

3. The program seemed quite adaptable to differing classroom situations.

4. Teacher attitudes were generally quite positive toward the program throughout the year.

5. The students in the classes appeared able to perform in a reasonable fashion during the lessons.

Evaluation Report 1-C-4

End-of-Year Data from Teacher Questionnaires

1974

This report describes the responses of participating teachers to a questionnaire mailed during the first week of June 1974.

Altogether 67 of the 116 end-of-year questionnaires were completed and returned, a 58% return rate.

The questionnaire was intended to elicit teachers' reactions to various aspects of the CSMP content, their reactions to the instructional materials, and their overall judgments, both comparative and absolute, regarding the worthiness of the program.

The following conclusions were drawn from the data.

1. Generally teachers responded favorably towards CSMP.

2. Where questions were repeated from a questionnaire given earlier in the year, responses tended to be similar to or slightly more positive than responses given at that time.

3. Teachers who were trained by CSMP personnel in one-week workshops responded more positively to several questions than did teachers who were trained by their coordinators.

4. Certain criticisms of the program were made by some teachers. One major one dealt with the slow learner problem. The second major criticism dealt with the large amount of material in the first grade.

Evaluation Report 1-C-5

Interviews with CSMP Kindergarten Teachers

1974

The purpose of this report is to describe observations and interviews conducted in the local kindergarten classes during the last month of the school year of 1973-74.

From all the questions asked and all the responses given in the interview a number of conclusions were drawn.

These conclusions leave one with an overwhelming impression that the teachers regard the program in a highly favorable light. The only problems identified with some consistency were the program's inappropriateness for the very slow learner, the disorganization and lack of explicitness of the guide, and the need for more emphasis on elementary counting and number concepts at the beginning of the course. Even these views were held by only some of the teachers.

Evaluation Report 1-C-6

Analysis of Teacher Logs

1974

During the school year 1973-74, each first grade and kindergarten teacher was requested to keep a weekly log, recording for each day, the identification number (or name) of the lesson, the time taken to teach the lesson, and a rating of "good," "fair," or "poor" for each lesson taught. They were also asked for their reactions to individual lessons and the program in general.

In the first grade, all of the responding teachers thought most of the lessons were good, with the outer ring teachers tending to rate the lessons higher than the local teachers. Even though the mean reported time for teaching each lesson was generally in agreement with the time recommended by the program, most of the teachers were not able to reach lesson A240 which was the minimum expectation for them. The reactions of both the local and outer ring teachers to individual lessons were mostly favorable and all but one of the reported anecdotes were also favorable to the program.

Like the first grade teachers, all of the responding kindergarten teachers thought most of the lessons were good with no apparent differences in the ratings between the local and outer ring teachers. The average time to teach a lesson was about 21 minutes. The reactions of both the local and outer ring teachers to individual lessons and the program in general were favorable and all but one of the reported anecdotes were also favorable to the program.

Evaluation Report 2-A-1

Final Summary Report Year 2

1975

In the fall of 1973, the Comprehensive School Mathematics Program (CSMP) began a longitudinal pilot study of its Elementary Program. Over 100 teachers began using the program, either in first grade or kindergarten. During the 1974-75 school year, the second year of this pilot study, most of these classes continued into second grade and first grade respectively and many new classes began using CSMP materials.

The present report is an attempt to summarize, in a a reasonably non-technical way, the information collected during the second year. While it is not possible, nor necessarily desirable, to suppress the opinions and prejudices of the evaluator, one hopes the reader can easily separate the presentation of data from the authors' interpretation of those data. In any case, if the reader wishes more information about certain of the data reported here or would like to see the actual tests or questionnaires or instruments used, he or she many consult the appropriate report in this Evaluation Report Series.

Evaluation Report 2-B-1

Second Grade Test Data

1975

Thirteen second grade classes in four districts in the local area studied the CSMP curriculum during the 1974-75 school year. A wide range of ability and socio-economic status was represented by these classes. For each CSMP class there was a comparison class, in the same school where possible. These classes were usually the same groups of students who were tested the year before in first grade in the CSMP-Non-CSMP comparisons described in Evaluation Report 1-A-3. In the fall a test of mental abilities was administered to all students and the scores from this test were used as covariates in the subsequent analysis between CSMP and Non-CSMP classes. Because of the rather careful pairing of classes such differences were generally quite small.

In summary, CSMP classes did better than Non-CSMP classes on both standardized measures and some "content-free" comparison tasks and this is true for both high and low ability students and for both original and transfer students. Although overall performance was generally adequate and at times praiseworthy for unique CSMP content, on those subtests involving arrow diagrams and the Minicomputer a considerable number of students had little or no success, and students who transferred into CSMP classes near the beginning of the year were not able to catch up with their classmates on CSMP concepts.

Evaluation Report 2-B-2

Readministration of First Grade Test Items

1975

The major purpose of this report is to compare the performance of two groups of first grade CSMP students; the teachers of the first group were new to CSMP and the teachers of the second group were the same teachers one year later. A lower performance the second year would support the contention that results obtained in the first year of the pilot study, 1973-74, were at least partly due to the enthusiasm of the teachers for a novel math program. A higher performance would support the view that teachers the second time around more than made up for any loss of enthusiasm because they were more familiar with the program.

In summary, it appears that CSMP teachers do just as well the second time around and that any loss due to the novelty effect of the program is more than balanced by the gain in experience. This is in agreement with statements made by these same teachers in a series of interviews conducted at the end of the school year (see Evaluation Report 2-C-3). In addition the data tends to corroborate the findings from last year and to cast some doubt on the possibility that in some cases CSMP students did better because they had better teachers. While the results are not strong enough to support a definite conclusion they tend to give additional credence to the results from last year.

Evaluation Report 2-B-3

Student Interviews

1975

During this second pilot study year, a series of interviews was conducted with 18 second grade students.

The purpose of these interviews was to investigate how children thought about and understood CSMP math. At the end of this section a brief summarization of some of the content areas is given, but this barely scratches the surface of the available information. Certainly a number of issues might be raised and conjectures made, but the reader will have to do that himself, and one suspects there might be considerable disagreement among different readers.

The interviews yielded disappointingly little information about how these students felt about CSMP. While these students seemed to like their math, they did not volunteer much regarding their reasons. Many responses were rather unenthusiastic, one-word answers, although they were usually rather chatty about other things, such as what they did over the week-end, and they seemed to enjoy the interviews and showing what they could do. Perhaps this is not surprising. After all this was <u>their regular</u> math program - the same one they had had since beginning first grade - certainly nothing experimental or new.

Evaluation Report 2-C-1

Teacher Questionnaire Data

1975

In the spring of 1975, a questionnaire was sent to all teachers using the CSMP curriculum either at the kindergarten, first, or second grade levels. Some of these teachers had taught CSMP the previous year (1973-74) and were classified as "Experienced" teachers. About 50% of the questionnaires were returned.

1. The clearest, most unequivocal responses (favorable) were given in answer to questions concerning student attitude.
2. Teachers felt that students' achievement was higher with CSMP than compared to previous years with other math programs.
3. There were many signs that the program appeared to be being implemented fairly well.
4. However, there were things happening which were not intended: three quarters of the teachers supplementing the program with Non-CSMP material; significant numbers of teachers spending more time with math; forty percent of the teachers receiving less than half the amount of teacher training; and many second and third grade teachers not completing even the minimum recommended portion of the curriculum.

In the author's opinion the two most damaging criticisms had to do with the (possibly related) issues of the efficacy of the Minicomputer and the appropriateness of the program for low ability students. 37% of the first and second grade teachers did not think the Minicomputer was a good device for teaching low ability students. Forty-one percent of the teachers thought CSMP less appropriate for low ability students than their previous math program.

Evaluation Report 2-C-2

Teacher Interviews, Second Grade

1975

This report describes the interviews conducted with the 18 local second grade teachers at the end of the school year. These were teachers of classes which began using CSMP materials in first grade the previous year. Hence the students had completed two years of the CSMP program.

One is left with an overwhelming impression that the teachers have a very high regard for the program. The only problems mentioned with any consistency were the difficulties experienced by the slower students, and the need for more emphasis on the basic addition and subtraction facts.

Evaluation Report 2-C-3

Teacher Interviews, First Grade

1975

This report describes the interviews conducted with 13 local first grade teachers at the end of the school year. These teachers all taught first grade CSMP during the previous year, 1973-74; they were the lead group of first grade teachers. Thus this was their second year in teaching the first grade CSMP curriculum.

1. Five teachers were from districts that will not be teaching CSMP next year. This may have caused them to respond or to teach the program in a different way than would be the case if they knew their students would be continuing into second grade in CSMP.

2. There was generally what might be called a "return to normality". Teachers were neither wildly enthusiastic nor extremely negative in their appraisals of various aspects of the program.

3. They were getting used to the program and had indeed incorporated it into their teaching so that CSMP was no longer "the new math program" but was becoming, in a sense, just plain "math".

4. Without doubt the teachers like the program and like teaching it.

5. The most positive aspect of CSMP was the enthusiasm that students had for the program.

6. The questions which drew the longest responses and the most disagreement were those regarding the appropriateness of the program for low ability students and the value of the Minicomputer as a teaching device.

Evaluation Report 3-8-1

Second and Third Grade Test Data Year 3

1976

This report summarizes test data collected from second the third grade classes during 1975-76, the third year of the CSMP Extended Pilot Test.

Briefly one can summarize the results as follows:

a) On standardized mathematics tests, CSMP classes generally did as well as or better than Non-CSMP classes. At third grade the differences were significant on both tests of the CTBS. At second grade the results were more equivocal; not reaching significance at any of the four sites, but usually in favor of CSMP, especially on the tests of computational skills. Similar results have occurred in previous years; small differences in favor of CSMP students which sometimes reached significance and sometimes did not.

b) On the MANS tests, CSMP classes scored significantly higher than Non-CSMP classes on both total MANS scores and on three of the subtests, and were close to significantly higher ($p<.10$) on three other subtests. Again this pattern is rather similar to results from previous years: consistently higher socres by CSMP classes in all subtests with significance reached on certain subtests and on the overall totals.

Evaluation Report 3-C-1

Teacher Questionnaire Data Year 3

1976

One hundred fourteen questionnaires were distributed to CSMP teachers at the second and third grade levels. Fifty-four percent did not return the questionnaires, and the findings reported herein are therfore based on 46% of the teacher sample. For the purpose of summarizing the data, second the third grade teacher responses are combined.

In an overall evaluation of CSMP, 90% of the resulting responses were judged to be positive. Over half indicated their students attitudes toward math were "better" or "much better" with CSMP. Also, over half the teachers felt that they did "better" or "much better" in math with CSMP than they would have with another program. But, seventy-six percent of the respondents indicated they would like CSMP to provide them with a means of evaluating their students' progress, with the majority of teachers suggesting that tests be employed for this purpose.

Three-quarters of the teachers supplemented the program with Non-CSMP material such as commercial worksheets, a figure comparable to that from previous questionnaires in lower grade levels. When asked to respond in a free response sytle to the question: "What is your opinion of the spiral approach as used in CSMP?" 58% of the resulting responses were judged to be positive. The majority of teachers were happy with the style of classroom management proposed by CSMP.

Evaluation Report 4-A-1

Final Summary Report Year 4

1977

This report summarized the data collected during this fourth year of the Extended Pilot Trial, in which the evaluation focussed on third grade students and teachers. Four separate evaluation reports describe in more detail the data summarized here:

4-B-1 Standardized Test Data, Third Grade

4-B-2 Mathematics Applied to Novel Situations (MANS) Test Data

4-B-3 Individually Administered Problems, Third Grade

4-C-1 Teacher Questionnaire Data, Third Grade

Evaluation Report 4-B-1

Standardized Test Data, Third Grade

1977

Throughout the Extended Pilot Trial, standardized tests have been used to compare CSMP and Non-CSMP students' performance on these traditional skills and concepts. This report describes the results of three such studies involving veteran CSMP third grade classes. These studies were carried out in three of the largest CSMP third grade sites which contained, between them, 33 of the 88 veteran CSMP classes of 1976-77.

In summary then, CSMP students at the end of third grade appear to be developing satisfactory computational skill. At one site, however, there is evidence that they do not do well on the "concepts" items of the CTBS, particularly those dealing with sets and number sentences.

Evaluation Report 4-B-2

Mathematics Applied to Novel Situations (MANS) Test Data

1977

In the evaluation of CSMP student achievement, two major questions have been asked. The first: Do students learn the basic concepts and skills, particularly computational skills, generally expected of students in elementary school? Standardized math achievement tests are used to gather data in answer to this question (Evaluation Report 4-B-1).

The second major question is: Are CSMP students, particularly after two or three years in the program, better able to deal with certain kinds of (novel) mathematical situations than are students who have not studied CSMP? A major study was carried out involving many classes of students from several CSMP sites who were tested with a specially developed series of tests called Mathematics Applied to Novel Situations (MANS).

On the tests of Mathematics Applied to Novel Situations there is considerable evidence to indicate that classes of students who have used the CSMP curriculum for at least three years score better than classes of students who have not. The finding holds for the classes in general, for classes at different ability levels, and for classes in all three sites tested (but only significantly so in two of the three sites). It is also clear that this finding holds at each ability level of the students tested and for both boys and girls. A large Appendix (A) to this report is devoted to a thorough discussion of the process whereby the MANS Scales were developed.

Evaluation Report 4-B-3

Individually Administered Problems, Third Grade

1977

This report describes the results of some individually conducted tests with third graders in the St. Louis region. The purpose of this task was to get a deeper understanding of the mathematical processes used by CSMP versus Non-CSMP students than paper and pencil allow. A great deal of information - the process of development, the complexity of the eventual format and the mass of student responses - has been summarized very briefly in this report. This study is exploratory and will continue, in one form or another, in higher grades.

In summary, there are very real differences in favor of CSMP students on a relatively small number of items. There is some evidence that above average CSMP students are better able to quickly check complete calculations; that CSMP students give fewer but better explanation for these calculations; that CSMP students are rather better at relating multiplication to division and addition; and that CSMP students are better able to "solve" a secret rule when required to choose the objects to be tested. For most of the other tasks however, the differences were not large enough to be of importance especially in view of the small numbers of students.

Evaluation Report 4-C-1

Teacher Questionnaire Data, Third Grade

1977

In May, 1977, a questionnaire was sent to all third grade teachers of CSMP (69 in all). In addition to the questionnaires, interviews were conducted with 32 of the 69 teachers at the three sites where end-of-the-year testing was conducted (Missouri, Georgia and Maine). This report summarizes the responses by these third grade teachers to interview and questionnaire items.

The responses are summarized according to three areas: Overall Judgments, Student Achievement and Mechanical Aspects.

The responses to the four overall judgment questions indicate a definitely favorable attitude towards CSMP although less favorable than in previous grade levels, and less favorable than from the previous year's third grade teachers.

In terms of teachers' opinions about student achievement there, are many indications that teachers see a need for more emphasis on basic skills. In addition almost 2/3 of the teachers felt it was less appropriate than their previously used math program, and this was the second most listed "worst aspect" of CSMP.

In terms of the mechanical aspect of the implementation teachers generally seemed to be able to cope with the program; most followed the schedule and expected to complete it by the end of the year.

Finally, most teachers felt reasonably well prepared for CSMP after their training.

Evaluation Report 5-B-1

Fourth Grade MANS Test Data

1978

This 1977-78 school year constituted the first of two years of the Extended Pilot Trial (EPT) of CSMP fourth grade materials.

This report describes the results of administering a series of 25 MANS Scales to the 9 fourth grade CSMP classes in the St. Louis area and to 8 comparison classes.

A general ability test was administered to these classes and the results showed the two groups of classes to be nearly equal, but above average in ability. Class mean scores were calculated for each MANS scale, and an Analysis of Covariance was performed using the general ability scores to adjust for any differences in ability between the two groups of classes.

CSMP classes did significantly better on <u>all</u> the Number Relationship and Large Number Computation scales; on <u>some</u> of the Estimation and "Other" scales; and on <u>one</u> of the more traditional Computation and Word Problem scales. Non-CSMP classes did better on only one scale, <u>Computation-Division</u>, and the difference was not significant. When means scores for these scales were calculated for students at different ability levels, it was found that when CSMP scores were higher <u>overall</u> on a given scale, they were also higher at each ability level.

Evaluation Report 5-B-2

Individually Administered Problems, Fourth Grade

1978

By 1977 materials through fourth grade had been developed and the 1977-78 school year constituted the first of two years of the External Pilot Test (EPT) for fourth grade materials with 36 fourth grade CSMP classes located in 16 school districts. Three kinds of tests were used: standardized tests (given routinely by the school districts), the MANS Scales (Mathematics Applied to Novel Situations, see Evaluation Report 5-B-1), and the individually administered problems of this report.

A series of 6 problem exercises was individually administered to samples of 6 students in CSMP and Non-CSMP classes in 3 school districts in the St. Louis area. Three of the exercises were administered to students in 9 CSMP and 9 Non-CSMP classes; the other three exercises were administerd to either 4 or 5 pairs of classes.

On two of the scales, Guess My 24 and Blocks of Squares, CSMP classes had significantly higher scores than did Non-CSMP classes. On one other scale, Mental Arithmetic, CSMP students had scores about 0.4 standard deviation higher than Non-CSMP students, but the differences did not reach significance in the subsequent analysis of class means. On the three remaining scales the differences between CSMP and Non-CSMP students were small and did not approach significance.

Evaluation Report 5-C-1

Teacher Questionnaire and Interview Data, Fourth Grade

1978

In May, 1977 a questionnaire was sent to all fourth grade teachers of CSMP (42 in all). In addition, interviews were conducted with a number of those teachers. Altogether, 34 teachers responded to at least some of these questions, either in an interview or on a questionnaire. This report summarizes the teacher responses to these questionnaires and interviews.

The summary data are based on combining all responses, whether from teachers of veteran classes or of entry classes, and whether received from a questionnaire or from an interview. Many of the questions have been asked on previous questionnaires or interviews (at lower grade levels). This year's responses are generally similar, but comparative data is shown were possible.

The data is summarized in two sections: responses having to do with the way the program was implemented and responses having to do with teachers' judgments about the quality of the program.

Most teachers received at least 20 hours of training and generally satisfied with it, used 45-60 minutes per day in math instruction with CSMP, and supplemented it with basic arithmetic operations and facts.

Teachers were generally positive in their evaluation of CSMP, but on nearly every question major criticisms were made by a few teachers.

Evaluation Report 6-B-1

Comparative Test Data: Fourth Grade

1978

At the end of the 1978-79 school year, a series of tests was administered to 30 fourth grade CSMP classes and to 21 comparable Non-CSMP classes.

Altogether 9 school districts were involved, in various geographic locations and various socio-economic levels.

The tests used to compare the two groups were the Stanford Achievement Computation Test and the MANS tests, a series of 24 short test scales intended to assess some of the underlying mathematical processes of the CSMP program. The Stanford Achievement Reading Comprehension Test was used as a statistical control for the small differences in ability between the two groups.

Class means were calculated for each scale and an Analysis of Covariance procedure, with reading as covariate and class mean as the unit of analysis, was used to compare the two groups of classes.

These findings were consistent with results from other grade levels, in other years and at other sites, namely that a) CSMP students do better with number relationships, estimation, certain kinds of word problems and fractions/decimals/negative numbers and b) there are no differences in geometry, place value, simple word problems and overall computational skills.

Evaluation Report 6-B-2

Preliminary Test Data: Fifth Grade

1979

This is a report of the first year of a two-year evaluation of the fifth grade materials of the Comprehensive School Mathematics Program (CSMP). In preparation for next year's full-scale evaluation of fifth grade, some student achievement scales were administered to a small group of St. Louis area classes, both CSMP and Non-CSMP. The study was intended to be both a pilot test of certain scales which might be revised for next year, and a preliminary comparative evaluation of CSMP/Non-CSMP achievement.

Briefly the main results are as follows:

1. There tended to be significant differences in favor of CSMP classes on scales dealing with mental arithmetic, number relations, number systems (other than whole numbers), certain word problems and problems with multiple correct answers.

2. There tended to be no significant differences on scales dealing with standard computation, geometry, probability and place value.

3. Similar results were obtained when CSMP-Non-CSMP comparisons were made at different levels of reading ability and by sex.

4. The above results are very consistent with previous findings, particularly those obtained in a large scale comparison of fourth grade classes. (See Evaluation Report 6-B-1).

Evaluation Report 6-C-1

Teacher Questionnaire Data: Grades 3-5

1979

In the spring of 1979, questionnaires were sent to all 158 teachers of third, fourth and fifth grade CSMP.

## Implementation of CSMP

1. About half of the teachers received the prescribed training.
2. About 1/3 of the teachers were spending more time than they did with their previous curriculum.
3. Almost all of the fifth grade teachers expected to complete most of the schedule of lessons while about 80% of the third and fourth grade teachers expected to do this.
4. About 2/3 of the teachers occasionally repeated or extended lessons and about half said they omitted some lessons.
5. Almost all teachers supplemented the program in some way, usually with computational practice.
6. Most teachers would like to see tests built into the instructional materials.

## Evaluation of CSMP

In summary, most teachers seemed to implement the program in a reasonable way, with fairly normal adaptations. And, although criticism was expressed concerning the related issues of computational skill development and some problems with low ability students, it is clear that a great majority of teachers had favorable overall reactions to CSMP.

Evaluation Report 7-B-1

Fifth Grade Evaluation: Volume 1, Summary

1980

In the spring of 1980, a series of mathematics tests was administered to 31 fifth grade classes using the Comprehensive School Mathematics Program and to 25 comparison classes using more traditional programs. In addition to the testing, considerable information was collected regarding teacher and student attitudes and implementation of the program.

A summary of all the results is given in this volume which is Volume I (Evaluation Report 7-B-1) of a three-volume set. Volume II (Evaluation Report 7-B-2) describes in detail the tests and results of the testing and Volume III (Evaluation Report 7-B-3) describes attitudinal and implementation data and their relationship to the test data.

Evaluation Report 7-B-2

Fifth Grade Evaluation: Volume II, Test Data

1980

In the spring of 1980, a series of mathematics achievement tests were administered to 31 CSMP fifth grade classes and to 25 comparison classes.

The main finding in this study is that CSMP classes, as they have in comparative studies at lower grade levels, demonstrate a clear superiority over Non-CSMP classes in many of the areas of mathematical thinking assessed by the MANS tests. In particular, this was true about: aspects of computation other than the exact answers using the classic algorithms; the production of multiple answers to problems; and discovering and using mathematical patterns and functional relationships. In addition, they had significantly higher scores in the three areas which receive increasing emphasis in the upper elementary grades, namely: fractions, decimals, and negative numbers. These gains were made without any corresponding decrease in scores on the more traditional areas of instruction: word problems and computation.

Item analysis data and different methods of analysis (using class, school and district means) confirmed these general results, though for some tests the advantage for CSMP students was smaller or non-existent for students at the lowest reading level.

Evaluation Report 7-B-3

Fifth Grade Evaluation: Volume III, Non-Test Data

1980

This report describes non-test data collected from the classes the testing of which was reported in 7-B-2. This non-test data includes information on implementation, teacher attitudes and student attitudes.

Teacher reaction to CSMP was favorable, and it was more favorable than was the reaction of Non-CSMP teachers to their particular program. Two related criticisms of the curriculum by CSMP teachers stood out above all others. First, many teachers consider the program inappropriate in some ways for low ability students. Second, most teachers think that CSMP does not provide enough practice in computation skills, which no doubt accounts for the great amount of computational practice they add to the curriculum.

Considerable supplementing of the CSMP curriculum occurred; an average of 25% of math time was spent on activities not in the "official" curriculum. This percent was about the same as for Non-CSMP teachers, but for those teachers supplementing activities were quite varied whereas for CSMP it was almost always computation practice.

From correlational data, teachers' approval of CSMP (using many different criteria) was associated with more "game" playing in class, less homework, more teacher training and less supplementing. This is not a surprising result; these characteristics may be thought of as indicating a more faithful version of CSMP in the classroom. Furthermore, these same characteristics are associated with higher scores in CSMP-oriented tests and lower scores in computationally-oriented tests.

Teachers were asked to rate the importance of the goal being tested by each of the scales used in this year's testing. For all scales the mean rating was above the medium ranking, with computation rated highest and probability lowest. There was very little difference in the mean ratings of CSMP and Non-CSMP teachers.

Using a 29 item attitude measure, 7 attitude scales were constructed. Generally, CSMP and Non-CSMP classes' attitudes didn't differ except that CSMP classes liked math less, compared to other subjects, than did Non-CSMP classes, but saw math as more open.

Evaluation Report 7-B-4

Re-evaluation of Second Grade, Revised MANS Tests

1980

This study compared CSMP and Non-CSMP students' performance at two sites using a streamlined revision of the MANS Tests (Mathematics Applied to Novel Situations, intended to assess some of the underlying thinking skills of the CSMP curriculum without using any of its special vocabulary). A total of 21 classes were tested, 12 CSMP and 9 Non-CSMP. The CSMP classes had studied the revised version of the CSMP curriculum.

On the total of the MANS Scales, CSMP classes averaged about 15% higher scores than Non-CSMP, a difference which was significant at the .01 level.

On seven of the 13 individual scales, CSMP classes scored significantly higher at the .05 level. Their best performance was in scales dealing with number relationships, mental arithmetic and number fluency. They did slightly better in estimation and word problems. There was no difference in computation scores.

These findings corroborate the findings from the more extensive Extended Pilot Test, conducted prior to revisions, except that there were larger CSMP advantages in two of the individual scales. The findings are also noteworthy because the simplification of the testing procedures should make it easier for other districts to use these tests which remain, nevertheless, powerful enough to show various cognitive effects of the CSMP curriculum.

Evaluation Report 7-B-5

Achievement of Former CSMP students at Fourth Grade

1980

A comparison of student achievement at the end of fourth grade on the MANS Scales was conducted in a district where CSMP was taught only in grades K-3, after which the district's regular program was used. These "CSMP" classes were compared with Non-CSMP students who had no previous CSMP experience. Except for this difference, the study was identical to one conducted a year earlier in which the CSMP classes had, in fact, studied CSMP from K-4.

The CSMP classes had significantly higher scores than Non-CSMP classes, at the .05 level, on nine scales:

2 of the 6 Computation scales
3 of the 5 Estimation scales
2 of the 5 Number Relationship scales
1 of the 3 Other Number System scales
1 of the 2 Place Value scales

On no scale was there a significant difference in favor of the Non-CSMP classes. Overall, the mean score across the 24 scales was 136.7 for the CSMP classes versus 118.4 for the Non-CSMP classes, a 15% difference which must be considered significant, educationally as well as statistically.

Surprisingly, (since these CSMP classes had been away from CSMP for a year), the data were strikingly similar to the data obtained in a previous large study in which the CSMP classes had studied CSMP through fourth grade. The exceptions were: a) the 5 scales dealing with number relationships and scale on decimals, in each of which the CSMP advantage was about half what it was previously, and b) the standardized computation test, where CSMP classes did about 10% better than Non-CSMP classes, a finding exactly the reverse of what happened previously.

Evaluation Report 7-B-6

Student Achievement, Rapid Implementation Model

1980

Two schools, one in a large Southern city and the other in a medium sized Midwestern suburb, began using The Comprehensive School Mathematics Program (CSMP) in fall of 1978. At that time CSMP was begun with all students through fourth grade rather than the more common grade-by-grade approach beginning only in first grade.

A series of tests was administered in the spring of 1978, 1979 and 1980. The purpose was to compare, at grades 2-4, the performance of students: before the introduction of CSMP (1978), after one year of CSMP (1979) and after two years' experience with CSMP (1980).

1. On the MANS tests, a series of tests designed to assess some of the underlying processes of CSMP without using any of the special terminology or problem situations of the curriculum, there was from 1978 to 1980 significant improvement at every grade level and this improvement was very consistent with CSMP-Non-CSMP comparisons made previously with the same tests.

2. At second grade this improvement took place in the first year, from 1978 to 1979, with no further change from 1979 to 1980. At third and fourth grades, there were modest gains the first year and further gains the second year.

3. The kinds of tests on which the 1980 students did relatively best - number relationships, mental arithmetic and estimation - were also the ones for which there had been a demonstrated CSMP superiority in previous studies.

4. On standardized tests, at second grade, there was virtually no change at either school in math scores relative to reading scores. At third and fourth grades there was usually a small decrease in the first year of CSMP followed by a more-than-compensating gain the second year; scores on the Concepts tests always increased relative to Computation scores.

Evaluation Report 8-B-1

Sixth Grade Evaluation, Preliminary Study

1981

In the spring of 1982 an Extended Pilot Test will be conducted in several school district which use CSMP through sixth grade. In preparation for this evaluation study, several MANS scales were developed and tried out in the spring of 1981. In addition, several scales used the previous year in fifth grade were retested with sixth graders in 1981. This report presents preliminary evaluation data from two very different school districts and statistical data from the tryout of these scales.

With regard to the preliminary evaluation data, even though the number of classes tested was low and not particularly representative, CSMP/Non-CSMP differences in student achievement were very similar to those found in previous studies.

The statistical data on the new scales being tried out indicated that in most categories, scales used previous grade levels performed well. As for the brand new scales, as usual, some performed well enough to be considered as revisable candidates for use in the larger-scale study of sixth grade student achievement next year. Some scales performed so poorly that they would most likely be replaced.

Note: Appendices A and B, which constitute the bulk of this report, appears only in the version of the report which is bound separately. They do not appear in the version with the other reports in the 8-X-N series.

Evaluation Report 8-B-2

Evaluation of Revised Second Grade, MANS Blue Level

1981

This report is an extension of Evaluation Report 7-B-4, Re-evaluation of Second Grade, Revised MANS Tests. The revised second grade MANS tests (called the Blue Level) were further revised after their initial use in 1980. The revisions were minor and still within the original purpose: to make the tests easier for local districts to use. In the Spring of 1981 the revised Blue Level MANS tests were administered to 20 CSMP and 20 Non-CSMP classes. The classes came from five rather distinctly different school district, but the majority were composed of lower ability students.

The primary objective of the further revision of the MANS Blue Level was judged to have been met: school districts are able to use the tests with essentially no problems. A secondary objective was to improve the technical quality of the individual scales. For some scales this objective was met, for others it was not.

The CSMP/Non-CSMP results of the testing were not quite so strongly in favor of CSMP as they had been in 1980. Nevertheless, on the total of the MANS scales, CSMP classes averaged over 10% higher scores than Non-CSMP, a difference than was significant at the .05 level. In each of the scale categories, the CSMP classes outscored the Non-CSMP classes, the difference being statistically significant in one of them: Number Patterns and Relationships.

Evaluation Report 8-B-3

Evaluation of Revised Third Grade, MANS Green Level

1981

This study compared CSMP and Non-CSMP students' performance at two sites using a streamlined revision of the MANS Tests (Mathematics Applied to Novel Situations, intended to assess some of the underlying thinking skills of the CSMP curriculum without using any of its special vocabulary). A total of 18 classes were tested, 10 CSMP and 8 Non-CSMP. The CSMP classes had studied the revised version of the CSMP curriculum.

On the total of the MANS Scales, CSMP classes averaged about 19% higher scores than Non-CSMP, a difference which was significant at the .01 level.

On ten of the fifteen individual scales, CSMP classes scored significantly higher at the .05 level, five of those ten a the .01 level. Their best performance was in scales dealing with number patterns and relationships, mental arithmetic, estimation, and word problems, followed by place value and negative numbers.

These findings corroborate the findings from the more extensive Extended Pilot Test, conducted prior to the revisions. The findings are also noteworthy because the simplification of the testing procedures makes the tests easier for other districts to use and still leaves the scales powerful enough to show various cognitive effects of the CSMP curriculum.

Evaluation Report 8-8-4

Three Evaluations of Gifted Student Use

1981

The Comprehensive School Mathematics Program (CSMP) has been developed as a K-6 curriculum in mathematics for ordinary classroom use. Nevertheless, during the last two or three years, school districts have begun to use CSMP for elementary school students identified as well above average in ability: gifted, upper track, etc. In the 1980-81 school year, three districts did this and also carried out some kind of testing program to evaluate student outcomes.

Each district had a somewhat different student identification procedure, a different type of utilization of CSMP and a different evaluation design, it is instructive to characterize the differences between the three and standardize the results so that comparisons can be made. In each site (district) the student achievement was measured using the MANS tests.

In terms of Total MANS score, except in fourth grade at Site 1, CSMP outscored Non-CSMP at every one of three grade levels at every site.

In terms of the six main MANS scale categories there is considerable variation in the results depending on the category of scale. Whereas the CSMP advantage is relatively weak in Computation, Number Patterns & Relationships, and Word Problems, it is strong in Estimation and Other Number Systems (fractions and decimals), and very strong in Probability.

Evaluation Report 8-C-1

Preliminary Study of CSMP "Graduates"

1981

One of the most important questions in the evaluation of CSMP is the ability of CSMP students to learn and do mathematics after they have completed the CSMP K-6 program and are enrolled in a "regular" mathematics program.

The present study is a preliminary investigation of one aspect of this question, a comparison of seventh grade math teachers' ratings of former CSMP versus former Non-CSMP students' performance in class.

The data are far from definitive, but Ex-CSMP students seem to be doing at least as well in their seventh grade math classes as Ex-Non-CSMP students when ability is controlled, and often they do better.

At two of three sites, Ex-CSMP students received higher teacher ratings for Participation in Class, Motivation, Creativity and Problem Solving, and Practical Applications; this advantage was usually significant in one of the sites, consistent but not quite significant at the other. At the third site, there were no differences between Ex-CSMP and Ex-Non-CSMP students.

Further analysis at one of the sites showed that Ex-CSMP students received significantly higher grades in mathematics, especially those in the middle ability ranges. Interviews with seventh grade math teachers at a fourth site, where CSMP Non-CSMP comparisons were not possible, confirmed the view that CSMP students had no difficulty in adapting to the usual classroom activities of seventh grade, and were in some ways, better students.

Evaluation Report 9-A-1

Summary of Student Achievement Data, Draft Report

1982

This draft report and draft report 9-A-2, will be revised into a Single Comprehensive Summary of CSMP.

Evaluation Report 9-A-2

Summary of Implementation Data, Draft Report

1982

This draft report and draft report 9-A-1, will be revised into a Single Comprehensive Summary of CSMP.

Evaluation Report 9-B-1

Sixth Grade MANS Test Data

1982

In the spring of 1982, a comparison study of student achievement was conducted, comparing 26 sixth grade CSMP classes with 37 Non-CSMP classes. This study was the final one of the CSMP Extended Pilot Test, in which at successively higher grade levels, CSMP and Non-CSMP performance was compared. Altogether 10 school districts were represented in the present study. CSMP and Non-CSMP classes were similar in overall ability, both groups being well above average.

The tests used for the comparison were the MANS Tests. An analysis of covariance procedure on the class means was used, with a built-in Vocabulary test serving as a covariate. The main results of this comparison of class means were the following.:

On the Total of MANS Tests, CSMP classes had higher scores (statistically significant at the .01 level), about 10% higher than Non-CSMP classes.

On the 12 mathematics categories into which the MANS Tests are divided, CSMP classes had significantly higher scores ($p < .01$) in 8 of them. Among the categories producing large differences in favor of CSMP were those dealing with estimation, mental arithmetic, number patterns, production of multiple answers, and algebraic processes.

On one category, Geometry, consisting of a single test, Non-CSMP classes had significantly higher scores ($p < .05$)

Evaluation Report 9-C-1

Sixth Grade Evaluation: Teacher Questionnaires

1982

This report describes non-test data collected from the classes tested in report 9-B-1 including implementation data and teacher attitudes.

## Implementation

Both CSMP and Non-CSMP teachers: were quite experienced teachers; averaged between 50-55 minutes of math time daily; and supplemented their respective math programs about equally (14% of the time) though CSMP supplementation was generally computationally oriented versus "enrichment" oriented for Non-CSMP teachers. CSMP teachers spent more time on teacher-led work and less on individual and small group work than did Non-CSMP teachers. As a group (CSMP teachers were more often likely to follow lesson plans in greater detail, think the lesson contents more challenging and view math class as more "fun", oriented toward creative activities and one of the easier subject to teach than their Non-CSMP counterparts.

## Teacher Attitudes

CSMP teachers gave higher rating to their program on overall quality, student interest and involvement, concept achievement, ability to do logical reasoning and word problems, and appropriateness for high ability students than did Non-CSMP teachers. CSMP teachers gave lower ratings on computation achievement and appropriateness for lower ability students.

## Overall Evaluation

The vast majority of CSMP teachers gave highly favorable evaluations of the program although some teachers thought it worked better with high or average ability students than it did with low ability students. An often cited strong point was its impact on students' thinking. Non-CSMP teachers, on the other hand, while generally satisfied with their programs, stated that it was adequate but cited the need for supplementary enrichment.

Cooperative Research Study

Bedford, Michigan

1981

MANS tests were administered only at second grade due to their being unavailable below grade two and due to the imcomplete implementation of the CSMP program in grade three. All the second graders in the school using CSMP were tested as were all the second graders in a comparable school not using CSMP.

Bedford, Michigan, is a middle class suburb of Toledo, Ohio, which is just across the state line. Bedford Public Schools has four elementary schools, one of which used CSMP informally with one teacher in 1979-80 and formally with most of the teachers K-3 in 1980-81.

Due to the small number of classes involved, the less conservative unit (student) was used as the unit of analysis, (of the results). On overall performance, Bedford CSMP students had an advantage that was statistically significant. This was also true for four of the seven MANS categories.

Compared to similar studies of second grades at other sites, the overall results in Bedford are much the same. There are a few differences at the category level. The Bedford CSMP students are relatively stronger in Computation and weaker in Estimation than CSMP students elsewhere.

Cooperative Research Study

Detroit, Michigan

1981

The Detroit Public Schools began using CSMP in a relatively small number of classes in grades K-1 in 1972. In 1979, money became available to begin a full scale implementation of CSMP. During that first year of implementation there were the usual start-up problems one might anticipate with this large number of classes.

By the second year, CSMP was more stabilized in these schools, though several implementation problems remain. In order to assess the progress of students in CSMP, a joint evaluation study was conducted by CEMREL and the Detroit Public Schools, comparing 10 CSMP and 10 comparable Non-CSMP second grade classes. The MANS test and the Math Score of the CAT were used to compare the performance of the two groups of classes.

The CSMP classes had a higher total MANS score that Non-CSMP classes, but the difference was not statistically significant. The Non-CSMP classes had a small, but not significant advantage on the CAT Total Math.

The MANS performance of both CSMP and Non-CSMP classes in Detroit is quite good, and at least as high as the corresponding CSMP and Non-CSMP classes in the other districts. This is not surprising since both groups of teachers were known to be among the better teachers.

Cooperative Research Study

Grinnell-Newburg, Iowa

1981

Approximately 40 students in Grinnell participated in the second through-fourth-grade part of gifted student program in mathematics, the grade level at which this evaluation study was conducted. It was the initial use of CSMP in Grinnell; the program supplemented the regular math program for about 15%-20% of the time.

At each grade level, scores on the MANS tests administered at the end of the 1980-81 year, were compared with scores from the previous year for similar students in the same grade who had not had CSMP. MANS scores increased at grades two and three by 10% and 7% respectively but declined at fourth grade by 6%.

Previous studies in which CSMP has been started at all grade levels the same year (rather than one-year-at-a-time) have shown that the greatest benefits during the first year of the program occur for second graders; fourth graders take another year before reaching the level of similar "experienced" CSMP students. However, no previous studies have shown declines in MANS scores. Furthermore the pattern of gains and losses on individual MANS tests was rather different from previous studies.

Several factors make this study less than ideal, not the least of which is the small number of students, the process of selection for testing, and the differences in test administration where the role of the tester is crucial because of the novel nature of the tests.

Cooperative Research Study

Harrisonville, Missouri

1981

Approximately 40 students in grades 2-6 participated in the Harrisonville School District program for gifted students. Part of the instruction involved the use of materials from the Comprehensive School Mathematics Program. These students were pretested in September and post-tested in May; the tests used were the MANS tests, a special series of tests developed to assess some of the underlying thinking skills of CSMP without using any of its special terminology or techiniques.

The average percent gains, across the various subtests, were 64%, 22% and 9% for grades 2-4 combined, fifth and sixth respectively.

The gain for second through fourth graders was very high and far exceeded results from previous studies comparing CSMP and non-CSMP students, as did the gains for fifth graders. For sixth graders, the lower gains can be at least partly explained by the ceiling effect; on most of the scales, the mean score on the pretest was at least 80% leaving little room for improvement.

The pattern of gains was usually similar to the pattern of CSMP-non-CSMP differences obtained in previous studies (with some exceptions noted in this report). Scales on which significant differences had previously been found tended to produce the largest gain in the present study.

Janesville, Wisconsin

Implementation Study

1981

The Janesville (WI) Public Schools adopted the use of CSMP with the upper (1/4 to 1/2) track classes. In 1980-81, approximately half the teachers of these classes (K-6) chose to use the program. Since this is a unique kind of implementation for CSMP, a site visit was arranged for May of this school year. This is a report of that visit.

Given the particular method of implementation the Janesville adoption appears to be exemplary; it has gotten off to a very good start and appears to have excellent prospects for future continuation. State funding appears to be continuous. Even the second round of (mostly non-volunteer) teachers have been brought around from largely a negative attitude to a largely positive one.

Cooperative Research Study

Janesville,Wisconsin Testing

1981

During 1980-81, the Janesville Public Schools began the use of the CSMP math program with about half of its upper ability elementary school classes. Due to the unusual nature of this adoption, a rather intensive evaluation of students performance was carried out in grades 2 through 4. Tests used in the usual CSMP evaluation studies were given to 11 CSMP and 10 comparable Non-CSMP classes in May. The tests included both standard computation and a number of MANS scales developed to test the effectiveness of the CSMP program.

The results of the testing showed the Janesville CSMP classes out-performing their Non-CSMP counterparts in much the same manner as has been found in other settings. In spite of the fact that the Janesville findings are quite positive in favor of CSMP, the reader is reminded that the study was done on a relatively small number of classes, with teachers who volunteered to use the new program.

Cooperative Research Study

Ladue, Missouri

1981

The Ladue (MO) Public Schools have been using CSMP for several years, implementing it one grade level per year with about half the classes. In 1980-81 for the second time, there were sixth grade CSMP classes in two of the schools.

A series of tests was administered to the 6 sixth grade CSMP classes and 6 Non-CSMP classes. The study was a follow-up to a study conducted last year in fifth grade with many of the same students, though many of the individual scales were being used for the first time. Hence the study served the dual purpose of a preliminary assessment of CSMP sixth graders and a pilot trial of new MANS scales.

CSMP classes had significantly higher total MANS scores than Non-CSMP classes when reading scores were used as a statistical control for ability level of classes.

Also interviews were conducted with 30 sixth grade students in order to assess students' understanding of the MANS scales and their methods of attempting them. Two new tasks were also tried. The interviews were primarily developmental in nature and did not lend themselves to statistical aggregation but, generally, CSMP students showed slightly more sophistication in their nomenclature and ease of solution.

Cooperative Research Study

New Orleans, Lousiana

1981

The MANS tests were administered to second, third, and sixth grade CSMP and Non-CSMP classes in New Orleans. At each grade level a small number of classes (7 to 9) was tested.

In second grade, CSMP classes had higher mean scores than Non-CSMP classes on each of the 7 MANS categories. The scores on Total MANS were 52.7 for CSMP and 44.9 for Non-CSMP, but this difference was significant at only the .2 level.

In third grade, CSMP classes had higher mean scores on 6 of the 7 categories. The scores on Total MANS were 66.7 for CSMP and 63.4 for Non-CSMP, a difference which did not even approach significance.

In sixth grade, CSMP had higher scores on all 9 MANS categories, significantly so in 4 of them. the total MANS scores were 154.7 for CSMP and 127.2 for Non-CSMP. Even this large a diffference was significant at only the .07 level.

The small number of classes and degrees-of-freedom limit the interpretation of the results, from a statistical and sampling point of view. Statistically, a large difference between CSMP and Non-CSMP scores is required before significance is achieved. Teachers were not randomly assigned and there is no adequate way to determine the comparability of the CSMP and the Non-CSMP teachers.

Cooperative Research Study

Ann Arbor, Michigan

1982

In order to compare CSMP and Non-CSMP classes in mathematics performance a special series of tests, the MANS Tests, was administered by specially trained testers to all second and third grade classes in Ann Arbor. For the most part these tests are problem solving in nature, and involve mathematical situation which were unfamiliar to both CSMP and Non-CSMP students. The testing took place in May, 1982, and involved a total of 93 classes.

The mean Total MANS scores, after adjusting for differences in ability (measured by a special vocabulary test), were as follows:

Second Grade: CSMP Classes - 98.2 Non-CSMP Classes - 85.6

Third Grade: CSMP Classes - 122.8 Non-CSMP Classes - 106.2

At both grade levels, the CSMP classes had higher scores by about 15%, and this difference was significant at the .01 level on the Analysis of Covariance of class means.

In addition to significantly higher Total scores, CSMP clases at each grade level had higher scores on each of the seven categories which make up the MANS test. The relatively weakest performance of the CSMP classes was in the Computation category, and even there they had higher scores than Non-CSMP classes, though the difference was not statistically significant.

Cooperative Research Study

Bronx, New York

1982

In order to assess the performance of Non-CSMP classes at P.S. 71, Bronx, New York, a special series of tests, the MANS tests, was administered to selected fourth grade Non-CSMP classes. For the most part, these tests are problem solving in nature, and involve mathematical situations which were unfamiliar to both CSMP and Non-CSMP students. The tests were administered by a specially trained tester to four fourth grade classes in May, 1982.

There were no CSMP classes at P.S. 71 so Non-CSMP performance was compared to CSMP and Non-CSMP classes in other districts which participated in the Spring, 1982 MANS testing. In each of those larger studies, CSMP classes had significantly higher scores than Non-CSMP classes. In general, the Bronx classes performed like other Non-CSMP classes, i.e., their scores were lower than CSMP classes.

Cooperative Research Study

Detroit, Michigan

1982

In order to compare CSMP and Non-CSMP classes in mathematics performance a special series of tests, the MANS Tests, was administered by a specially trained tester to 13 CSMP third grade classes and 6 Non-CSMP classes in Detroit. For the most part these tests are problem solving in nature, and involve mathematical situations which were unfamiliar to both CSMP and Non-CSMP students. Thes testing took place in May, 1982.

The mean Total MANS scores, after adjusting for differences in ability (measured by a special vocabulary test), were 90.3 for CSMP classes versus 82.5 for Non-CSMP classes.

This difference was not significant at the traditional .05 level. The level of significance achieved was .20 on the Analysis of Covariance of class means. Thus the probability of this large a difference occurring by chance is less than .20, or less than once chance in 5. The results are highly suggestive, but do not conclusively demonstrate that CSMP classes are superior on these kinds of tests.

Inspection of the graphs of class means reveals that the Non-CSMP classes' performance on the MANS test could be predicted quite well from vocabulary scores. CSMP classes, however, tended to divide into 2 groups. One group of about 5 classes performed like Non-CSMP classes in that the MANS scores were very close to the regression line on Vocabulary score. The remaining 8 classes performed the way CSMP classes in other sites have historically performed, that is, higher MANS scores. Three classes in particular had very high scores. CSMP therefore benefitted most, but not all classes, and this differential effect may be due to differences in teacher ability, or willingness, to implement the curriculum.

Cooperative Research Study

Glendale-River Hills, Wisconsin

1982

CSMP is being used as the only mathematics curriculum in Glendale-River Hills for grades K-3 and is available as a supplement in fourth and fifth grades. It was therefore not possible to compare, at any grade level, mathematics achievement of CSMP and Non-CSMP classes within the district. However, at each of these grade levels, comparison studies were being conducted at other sites and it was therefore possible to compare Glendale classes with those in other districts.

Since some fourth and fifth grade students in Glendale did have previous CSMP experience, it was also possible at these grade levels to compare their performance with the performance of the other Glendale students. The vehicle for this evaluation was the MANS tests (Mathematics Applied to Novel Situations).

In general, Glendale, (CSMP) second and third grade clases performed better than comparable Non-CSMP clases elsewhere, but not quite as well as comparable CSMP clases at other sites. While the Glendale fourth and fifth grade classes performed about as well as comparable classes (taking CSMP and Non-CSMP as a group), analysis at the student level showed ex-CSMP Glendale students (as a group) performing as well as comparable CSMP classes elsewhere: i.e. significantly better than Non-CSMP clases.

Cooperative Research Study

Globe, Arizona

1982

In 1981-82, the Comprehensive School Mathematics Program (CSMP) was being used in some K-2 classes in Globe. In May, 1982 a small study was conducted to compare two CSMP second grade classes and two Non-CSMP second grade classes.

The vehicle for this evaluation was the MANS tests (Mathematics Applied to Novel Situations).

Because there were only two CSMP and two Non-CSMP clases tested, it was not appropriate to make statistical comparisons with significance, tests, etc. However, because there were many second grade classes from other participating school district, it was possible to analyze the combined performance of these classes and to evaluate the performance of the Globe clases in this context.

Overall, CSMP classes had significantly higher scores than Non-CSMP classes. However, the Globe CSMP cl:sses do not appear to be doing as well as most of the CSMP clases in other sites, but about as well as Non-CSMP clases elsewhere.

The Globe Non-CSMP classes performed very much like comparable Non-CSMP classes elsewhere

Cooperative Research Study

Hawaii

1982

In order to compare CSMP and Non-CSMP classes in mathematics performance a special series of tests, the MANS Tests, was administered by a specially trained tester to three CSMP second grade classes and to three Non-CSMP classes in Hawaii. For the most part these tests are problem solving in nature, and involve mathematical situations which were unfamiliar to both CSMP and Non-CSMP students. The testing took place in May, 1982.

The mean Total MANS scores, after adjusting for differences in ability (measured by a special vocabulary test), were as follows:

Second Grade: CSMP Classes - 112.0

Non-CSMP Classes - 93.0

In addition to higher Total scores, CSMP classes had equal or higher scores on each of the seven categories of mathematics processes which make up the MANS tests, and significantly higher scores on four of them: Computation; Estimation; Relationships and Number Patterns; and Word Problems.

Cooperative Research Study

Janesville, Wisconsin

1982

In order to assess the performance of CSMP classes in Janesville, a special series of tests, the MANS tests, was administered to selected CSMP classes in grades 2 - 5. For the most part, these tests are problem solving in nature, and involve mathematical situations which were unfamiliar to both CSMP and Non-CSMP students. The tests were administered by specially trained testers in 15 Janesville classes in May, 1982.

There were no Non-CSMP classes in Janesville comparable in ability to these high ability CSMP classes. The CSMP performance at each grade level in Janesville was therefore compared to CSMP and Non-CSMP classes in other districts which participated in MANS testing at the same time during Spring, 1982. In each of those larger studies CSMP clases had significantly higher scores than Non-CSMP clases, and in each of grades 3 - 5 the Janesville classes performed at least as well as other CSMP classes and contributed to the overall CSMP advantage. At second grade, the overall Janesville performance was not as strong as other CSMP classes, but was generally better than comparable Non-CSMP classes.

The Janesville classes also reflected the strong (and significantly higher) CSMP scores in particular categories of mathematical problems, especially those dealing with: estimation; mental arithmetic; and number patterns and relationships. They also reflected the overall performance in computation in which there were no significant differences at any grade level in favor of either CSMP or Non-CSMP classes.